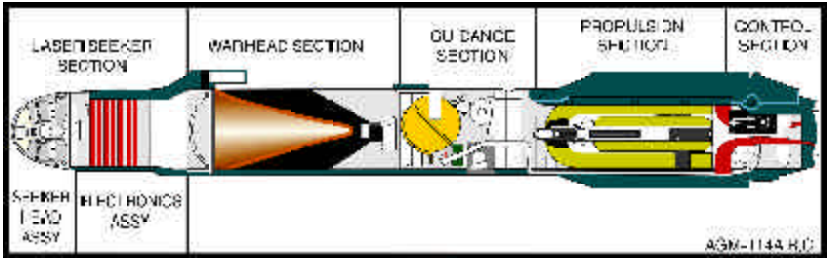

ARM
Aviation Rockets and Missiles

LASER HELLFIRE
BASIC AGM-114A, C & B

Aviation Rockets and Missiles



***SYSTEM DESCRIPTION*:** HELLFIRE is a laser-guided, air-to-ground missile system designed to defeat individual hard point targets and minimize exposure of the delivery vehicle to enemy fire. HELLFIRE is the primary armament for the U.S. Army's AH-64 Apache and USMC's AH-1W Super Cobra Helicopters. HELLFIRE has been qualified for use on the UH-60 Black Hawk and the OH-58D Kiowa Warrior helicopters.

SYSTEM CHARACTERISTICS: Laser HELLFIRE is a laser guided, anti-armor weapon which homes on a laser spot that can be projected by ground observers, the launching aircraft, or other aircraft. HELLFIRE's ability to engage single or multiple targets directly or indirectly and to fire single, rapid, or ripple *(salvo)* rounds gives combined arms forces a decisive battlefield advantage. The AGM-114A Model Missile is tactically obsolete and used for training. The AGM-114C Model contains an improved low visibility (ILV) missile autopilot, which enhances performance in periods of low cloud cover, and a minimum smoke motor which improves helicopter survivability by reducing primary missile smoke. The AGM-114B is the Navy version and contains a motor safe and arm device for shipboard compatibility. Basic Laser HELLFIRE is 64 inches in length and weighs 100 lbs. Weapon range is approximately 8 km.

SEEKER: The HELLFIRE Laser Seeker is designed to acquire and track targets with laser energy by using the energy reflected from the target. It is packaged in two separable units: the seeker head assembly and the electronics package.

WARHEAD: The High-Explosive Anti-Tank (HEAT) warhead functions by the crushing of the nose of the seeker head. The crush switch provides a detonation signal to the fuze when impact occurs. This shaped charge warhead consists of a conical copper liner and LX-14 explosive. The lethal mechanism is formed when the initiated explosive collapses the liner and generates an armor piercing jet.

TARGET SETS: Primary - Tanks. Secondary - radar installations, communications posts, bunkers, buildings, air defense units, armored personnel carriers, oil rigs and bridges.

CONTRACTOR: Martin Marietta and Rockwell International. During the first (FY 82) and second (FY 83) production buys seekers were produced from Martin Marietta Orlando Aerospace and provided to Rockwell International as government-furnished equipment for assembly into all-up-rounds. Dual source competition with a split of the award quantity was the acquisition strategy from FY 84 through FY 89.

ACQUISITION PHASE: Sustainment. The AGM-114A missile is tactically obsolete and used for training purposes only.

MILESTONES:

Milestone II	Feb 76
Milestone III	Mar 82

***FIELDING*:** FUE Dec 85. 114A is used for training. 114C is fielded to U.S. Army Aviation units in CONUS, USAREUR, & Korea. 114B is fielded to U.S. Navy.

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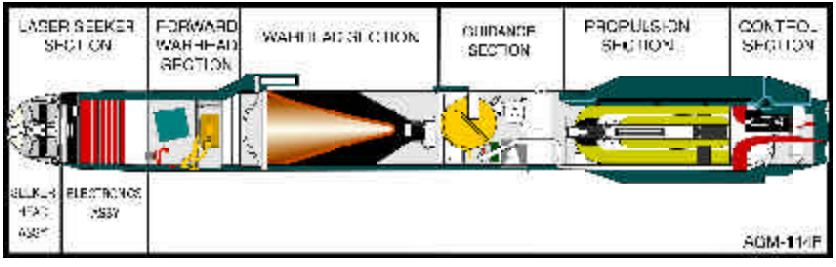

SYSTEM DESCRIPTION: HELLFIRE is a laser-guided, air-to-ground missile system designed to defeat individual hard point targets and minimize exposure of the delivery vehicle to enemy fire. HELLFIRE is the primary armament for the U.S. Army's AH-64 Apache and USMC's AH-1W Super Cobra Helicopters. HELLFIRE has been qualified for use on the UH-60 Black Hawk and the OH-58D Kiowa Warrior helicopters.

SYSTEM CHARACTERISTICS: Laser HELLFIRE is a laser-guided, anti-armor weapon which homes on a laser spot that can be projected by ground observers, the launching aircraft, or other aircraft. HELLFIRE's ability to engage single or multiple targets directly or indirectly and to fire single, rapid, or ripple *(salvo)* rounds gives combined arms forces a decided battlefield advantage. The AGM-114F model was initiated as an interim solution to increase the lethality of the basic missile against reactive armors until a fully optimized missile could be developed. This model incorporates a forward precursor warhead in addition to the main warhead. Interim Laser HELLFIRE is 71 inches in length and weighs 107 lbs. Weapon range is approximately 8 km.

SEEKER: The HELLFIRE Laser Seeker is designed to acquire and track targets with laser energy by using the energy reflected from the target. It is packaged in two separate units, the seeker head assembly and the electronics assembly, and is self-contained with the exception of the primary DC power which is provided by the parent missile.

WARHEAD: The High Explosive Anti-Tank (HEAT) Warhead is a tandem warhead design consisting of a smaller precursor shaped charge warhead and a main shape charge warhead. The warheads function by crushing the nose of the seeker head. The crush switch provides a detonation signal to the fuze when impact occurs. These shaped charge warheads both consist of a conical liner and LX-14 explosive. The lethal mechanism is formed when the initiated explosive collapses the liner and generates an armor piercing jet.

TARGET SETS: Primary - Tanks. Secondary - radar installations, communications posts, bunkers, buildings, air defense units, armored personnel carriers, oil rigs and bridges.

CONTRACTOR: Rockwell International Corp.

ACQUISITION PHASE: Sustainment.

MILESTONES:

First Production Contract Awarded	Mar 90
First Production Delivery	Sep 91

FIELDING: FUE: FY 91. Fielded to U.S. Army Aviation units in CONUS, USAREUR & Korea. Currently prepositioned in Kuwait and on ships.

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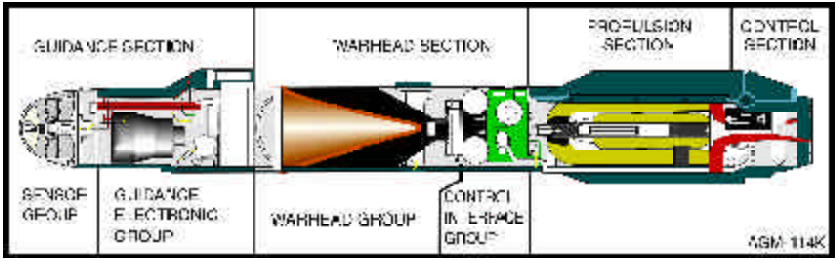

SYSTEM DESCRIPTION: HELLFIRE II *(AGM-114K Model)* incorporates many improvements over basic HELLFIRE, including electro-optic countermeasure hardening, increased warhead lethality, electronic fusing, and software controlled digital seeker and autopilot electronics. HELLFIRE II is the primary armament for the U.S. Army's AH-64 Apache and USMC's AH-1W Super Cobra Helicopters. HELLFIRE II has been qualified for use on the UH-60 Black Hawk and the OH-58D Kiowa Warrior helicopters.

SYSTEM CHARACTERISTICS: HELLFIRE II is a laser-guided anti-armor weapon which homes on a laser spot that can be projected by ground observers, the launching aircraft, or other aircraft. HELLFIRE's ability to engage single or multiple targets directly or indirectly and to fire single, rapid, or ripple *(salvo)* rounds gives combined arms forces a decided battlefield advantage. Starting with the FY 95 buy, an Insensitive Munitions Warhead was incorporated which improves helicopter survivability. Laser HELLFIRE II is 64 inches in length and weighs 100 lbs. Weapon range is approximately 8 km.

SEEKER: The HELLFIRE Laser Seeker is designed to acquire and track targets with laser energy by using the energy reflected from the target. It is packaged in two separable units, the sensor group assembly and guidance electronics group.

WARHEAD: The High Explosive Anti-Tank (HEAT) Warhead is a tandem warhead design consisting of a smaller precursor shaped charge warhead and a main shape charge warhead. The warheads function by crushing the nose of the seeker head. The crush switch provides a detonation signal to the fuze when impact occurs. These shaped charge warheads both consist of a trumpet liner and PBXN-9 explosive. The lethal mechanism is formed when the initiated explosive collapses the liner and generates an armor piercing jet. The precursor warhead is designed with a high performance molybdenum liner to initiate any Explosive Reactive Armor (ERA) which might have been effective against any unitary charge warhead. The main warhead built with a copper liner provides very effective main armor penetration.

TARGET SETS: Primary - Tanks. Secondary - radar installations, communications posts, bunkers, buildings, air defense units, armored personnel carriers, oil rigs and bridges.

CONTRACTOR: HELLFIRE Systems Limited Liability Company *(Joint Venture between Lockheed Martin Corp. & Boeing North American Corp.)*

ACQUISITION PHASE: Sustainment

MILESTONES:

Milestone III May 93

FIELDING: FUE: FY 94 Fielded to U.S. Army Aviation units.

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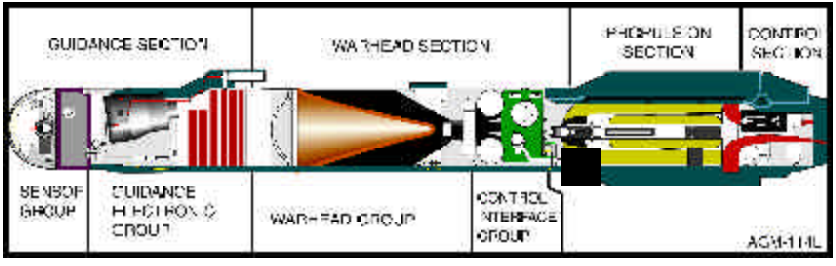
LONGBOW HELLFIRE AGM-114L



SYSTEM DESCRIPTION: The Longbow HELLFIRE (LBHF) missile is a fire-and-forget missile which uses radar-aided inertial guidance. It is part of the Apache AH-64D Longbow system which also includes a mast-mounted millimeter wave fire control radar with associated electronics designed to greatly increase the survivability of the host helicopter. LBHF will provide the capability to conduct battle both day and night, in adverse weather conditions, and with battlefield obscurants present.

SYSTEM CHARACTERISTICS: The Longbow HELLFIRE missile utilizes millimeter wave radar-aided inertial guidance to provide a lock-on before launch (LOBL) or lock-on after launch (LOAL) capability, depending on target range and velocity. Starting with the FY 97 buy, an Insensitive Munitions Warhead was incorporated which improves survivability. It is planned that Longbow HELLFIRE missile also will be used on the Comanche. Longbow HELLFIRE is 69.2 inches in length and weighs 108 lbs. Weapon range is approximately 8 km.

SEEKER: The Longbow HELLFIRE missile incorporates a Ka- band millimeter wave seeker comprised of a transmitter/receiver, inertial measurement unit, and digital signal processing electronics.

WARHEAD: The High Explosive Anti-Tank (HEAT) warhead is a tandem warhead design consisting of a smaller precursor shaped charge warhead and a main shaped charge warhead. The warheads function by crushing the nose of the seeker head. The crush switch provides a detonation signal to the fuze when impact occurs. These shaped charge warheads both consist of a trumpet liner and explosive. The lethal mechanism is formed when the initiated explosive collapses the liner and generates an armor piercing jet. The precursor warhead is designed with a high performance molybdenum liner to initiate any Explosive Reactive Armor (ERA) which might have been effective against any unitary charge warhead. The main warhead built with a copper liner provides very effective main armor penetration.

TARGET SETS: Primary - Tanks, Infantry Combat Vehicles

CONTRACTOR: Longbow Limited Liability Company *(Joint Venture between Lockheed Martin Corp. and Northrop Grumman Corp.)*

ACQUISITION PHASE: Production. Longbow HELLFIRE entered full rate production in 1997. Multi-year contract was awarded Apr 99 for FY 99 - FY 03.

MILESTONES:

Milestone I IPR	Aug 85
Milestone IB ASARC	Jul 89
Milestone II DAB	Dec 90
Milestone IIIA DAB	Oct 95
Milestone IIIB ASARC	Oct 97

FIELDING: IOC: OCT 98. Currently fielded to U.S. Army Aviation units.

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HELLFIRE BLAST FRAGMENTATION WARHEAD MISSILE AGM-114M

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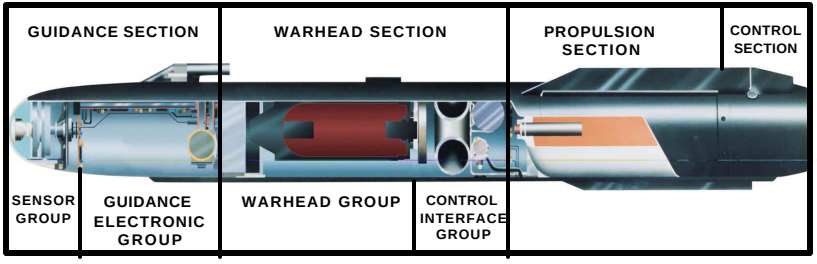

SYSTEM DESCRIPTION: The Blast Fragmentation Warhead Missile *(Blast Frag)* incorporates many improvements over the basic HELLFIRE, including electro-optic countermeasure hardening, electronic digital fusing and a penetrator warhead. The Blast Frag is a supplemental armament for the U.S. Navy and USMC's AH-1W Super Cobra and HH-60 Seahawk Helicopters.

SYSTEM CHARACTERISTICS : HELLFIRE Blast Frag Missile is a laser-guided penetrator weapon which homes on a laser spot that can be projected by ground observers, the launching aircraft, or other aircraft. The missile's ability to engage single or multiple targets directly or indirectly and to fire single, rapid, or ripple *(salvo)* rounds gives combined arms forces a decided battlefield advantage. The Blast Frag Missile incorporates an Insensitive Munitions Warhead which improves helicopter survivability. The HELLFIRE Blast Frag Missile is 64 inches in length, weighs 106 lbs. Weapon range is approximately 8 km.

SEEKER: The seeker is designed to acquire and track targets with laser energy by using the energy reflected from the target. It is packaged in two separable units, the sensor group assembly and guidance electronics group.

WARHEAD: The blast fragmentation is a penetrator warhead design consisting of a hardened casing with insensitive explosive munition (PBXN109). The warhead functions by crushing the nose of the seeker head and penetrating the intended target. The crush switch provides a detonation signal to the fuze when impact occurs activating a time delay circuit. The lethal mechanism is formed after target penetration where multiple fragments are generated. The main warhead is a hardened steel casing with scoring that provides a very effective target penetration and fragment saturation.

TARGET SETS: Primary – Ships, patrol boats, radar and communications installations, air defense units, armored personnel carriers, oil rigs and bridges.

CONTRACTOR: HELLFIRE Systems Limited Liability Company.

ACQUISITION PHASE: Production

MILESTONES: Delivery to Navy May 01

FIELDING: Navy/USMC May 01

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M299 HELLFIRE LAUNCHER

Aviation Rockets and Missiles

SYSTEM DESCRIPTION: The M299 Longbow HELLFIRE Launcher (LBHL), part number 13425104, is a modified M272 HELLFIRE Launcher. The launcher has a MIL-STD-1760 aircraft interface and can launch all configurations of the HELLFIRE missile.

SYSTEM CHARACTERISTICS : The missile weight is 108 pounds, it is 69.2 inches long and has a diameter of 7 inches. The empty M299 Launcher weight is 145 pounds. The Launcher dimensions are 57.5" Long X 20" Wide X 21.5" in Height.

LAUNCHERS: Modifications to the LBHL include development of the Launcher Electronics Assembly (LEA), which replaces the Electronics Command Signals Programmer (ECSP); redesigned upper and lower rail harnesses; elimination of the hoist adapter; and a reduced hardback and lower rail support weight. The LEA design incorporates self-contained, microprocessor-controlled BIT and a smaller number of LRMs. Weapon functions previously performed by the aircraft processor are now accomplished by the LEA. The LEA also includes software used to provide a simulated Longbow missile training capability. This function is called the Training Missile Emulator.

CONTRACTOR: Lockheed Martin.

ACQUISITION PHASE: In production.

FIELDING**:** 1st fielding FY98, continuing through FY06.

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ADVANCED PRECISION KILL WEAPON SYSTEM (APKWS) BLOCK 1

Aviation Rockets and Missiles

SYSTEM DESCRIPTION: The Advanced Precision Kill Weapon System (APKWS) will meet the need for an inexpensive, small, lightweight, precision weapon that is effective against targets too light to be engaged by HELLFIRE and too heavy to be engaged by HYDRA 70. The system will be employed from all aircraft currently using the HYDRA 70.

SYSTEM CHARACTERISTICS: The system will utilize the HYDRA 70 components such as the rocket motor, warhead, and the point detonating fuze. The guidance will be Semi-Active Laser (SAL) Lock On After Launch (LOAL). The system's accuracy approaches that of the Laser HELLFIRE Missile. Its warhead provides sufficient lethality to destroy soft and light armored point targets while its improved accuracy minimizes collateral damage.

SENSOR/SEEKER: Semi-Active Laser (SAL) Lock On After Launch (LOAL).

WARHEAD: M151High-Explosive Warhead

TARGET SETS: Anti-materiel *(command and control facilities, logistics facilities)*, anti-personnel, air defense systems *(mobile and fixed)*, and light armor *(wheeled and track)*. Also, low signature soft targets embedded in complex, cluttered environments.

CONTRACTOR: General Dynamics Armament & Technical Products

SUBCONTRACTOR, GUIDANCE PACKAGE: BAE Systems, Mission Electronics

ACQUISITION PHASE: System Development and Demonstration Phase.

MILESTONES:	ATD	FY 02
	MSB	FY03
	MSC	FY05
FIELDING:		FY 07

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HYDRA 70 ROCKET SYSTEM

Aviation Rockets and Missiles

***SYSTEM DESCRIPTION*:** The family of Hydra 70 rockets performs a number of roles including anti-materiel, anti-personnel, and air-to-ground suppression missions. The rockets also provide smoke screening and illumination functions. The family of HYDRA 70 rockets are fired from Apache, Cobra, and Kiowa Warrior helicopters by the Army and are fired from various other fixed and rotary-wing platforms by Special Operations Forces, the Marine Corps, the Navy, and the Air Force.

SYSTEM CHARACTERISTICS: The 2.75 inch rocket is a free-flight rocket that has become the standard ground-attack rocket and was used extensively in the Korean War, Vietnam, and Desert Storm. The warheads contained on the Hydra 70 rocket fall into three categories: (1) Unitary warheads with an impact-detonating fuze or a remote-set, multi-option fuze; (2) Cargo warheads with an airburst, range-settable fuze using the "wall-in-space" concept, or a fixed-standoff fuze; and (3) Practice warheads.

WARHEADS:	***FUZES:***
M261 MPSM - Tactical	M439/M230
M267 MPSM - Practice	M439/M231
M151 HEPD - Anti-personnel, 10 pound	M423, M427 (super quick)
M151 HERS - Canopy/soft bunker, 10 pound	M433
M229 HEPD - Anti-personnel, 17 pound	M423
M274 Smoke Signature - Practice	M423 S&A
M257 Illumination - Battle target illumination	M442
M264 Smoke (RP) - Air-to-ground	M439
M255A1 Flechette - Air-to-air/air-to-ground	M439
M278 Illuminating IR Flare - Battle target illumination	M442

TARGET SETS*: A*nti-materiel *(command and control facilities, logistics facilities)*, anti-personnel, air defense systems *(mobile and fixed)*, and light armor *(wheeled and track)*.

CONTRACTOR: General Dynamics is the system contractor for the family of rockets.

ACQUISITION PHASE: Production, Fielding/Deployment, and Operational Support

MILESTONES:

Milestone III - September 1993 *(M255A1)*

***FIELDING*:** Complete

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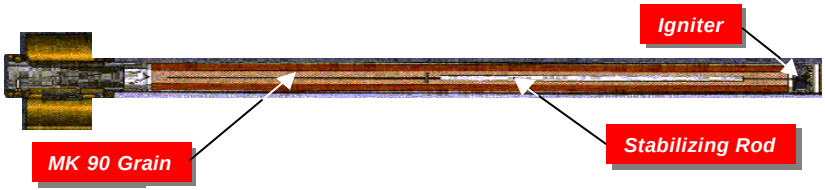
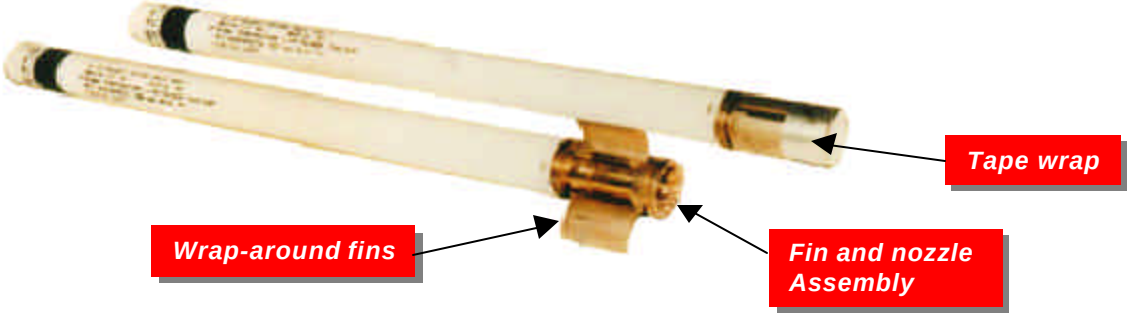
HYDRA 70 ROCKET MOTOR, MK66



***SYSTEM DESCRIPTION*:** HYDRA 70 Rockets are free-flight rockets which mate either unitary or cargo warheads with the MK66 Rocket Motor. The MK66 motors have a substantially higher thrust at 1335 lbs and a longer range *(8.8 km)* with a 10- pound warhead.



SYSTEM CHARACTERISTICS: The MK66 motors use a longer motor tube *(than the MK40/MK4)* that is of a different aluminum alloy, and is assembled with a new fin and nozzle assembly. The fins are of a spring loaded, wrap-around design and are attached around the circumference of the single nozzle. Upon exit from the launcher, the fins lock in place. The propellant grain is longer and of a different formation than for the MK40/MK4; however, the stabilizing rod and igniter are essentially the same design.

MOTORS: The Hydra 70 Rocket System currently uses the MK66 motor. The current motor version is the MK66 MOD 4 which was first fielded in 1Q FY 00 and is used by all of the Services. Earlier versions of the MK66 motor remain in the inventory. When compared to the older MK40/KM4 motors, the MK66 motors use a longer motor tube that is comprised of a different aluminum alloy and utilize a new fin and nozzle assembly. The fins are a spring loaded, wrap-around design and are attached around the circumference of the single nozzle. The propellant grain burns outward radially from the inside bore facilitated by a 7-point star pattern. The MK66 motors have a substantially higher thrust which provides a longer range than the older MK40/MK4 motors.

TARGET SETS: Anti-materiel *(command and control facilities, logistics facilities)*, anti-personnel, air defense systems *(mobile and fixed)*, and light armor *(wheeled and track)*.

CONTRACTOR: General Dynamics is the system contractor for the family of rockets.

ACQUISITIONPHASE: Production, Fielding/Deployment, and Operational Support.

MILESTONES:

Milestone III - February 1982 *(MOD 1)*
Milestone III - February 2000 *(MOD 4)*

***FIELDING*:** Complete

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HYDRA 70 ROCKET LAUNCHERS

M261 LAUNCHER

***SYSTEM DESCRIPTION*:** The U.S. Army Lightweight Launchers (LWL) are the M260 *(7-tube)* and the M261 *(19-tube)* launchers. The aluminum launchers are inexpensive enough to be disposable yet durable enough to be reused after as many as 32 firings. The weight savings over the previous Army launchers allows the Army to add other features to the aircraft's rocket system for improved performance. The launcher permits fuze-timing selection from the cockpit and will launch rockets using either the MK40 or the MK66 motors.

M260 LAUNCHER

SYSTEM CHARACTERISTICS: The empty M260 launcher weight is approximately 35 pounds. The weight of a fully loaded M260 launcher varies from 196.2 pounds to 317.7 pounds as a function of which warhead is carried. An M261 Light Weight Launcher weighs approximately 82 pounds empty. A fully loaded M261 Light Weight Launcher weighs between 493 pounds and 660 pounds depending on the configuration. The firing interval that the launcher normally experiences from the fire control is 0.06 seconds.

LAUNCHERS: The aft end of each tube in the launcher is fitted with a pivoting igniter arm which imparts the ignition current from the firing switch to the rocket motor. A side contact is lowered inside the launch tube for MK66 ignition with the actuation of the pivoting arm. When the rocket is fired, the igniter arm is pushed back and a mechanical link assists in releasing the rocket from the rocket retainer. The primary mode of release is rocket override of the retainer in the launcher. The rocket retention force is 170 to 600 pounds, easily overridden by the rocket thrust of over 1300 pounds. The launcher strongback establishes the rigidity of the launcher and is designed in accordance with MIL-A-8591 for interface with aviation suspension racks and sway braces. Electrical connectors are referred to as J1 and J2 connectors. The J1 connector (P/N 13048761) is a 26-pin connector for the motor ignition circuit and the J2 (P/N 13048762) is a 23-pin connector for the fuze setting circuit.

TARGET SETS: Anti-materiel *(command and control facilities, logistics facilities)*, anti-personnel, air defense systems *(mobile and fixed)*, and light armor *(wheeled and track)*.

CONTRACTOR: The launchers are currently out of production.

ACQUISITION PHASE: Production, Fielding/Deployment, and Operational Support.

MILESTONES:

Milestone III - FY 78

***FIELDING*:** Complete

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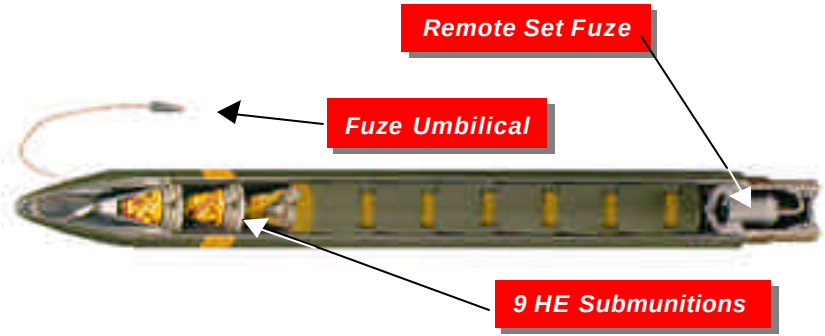
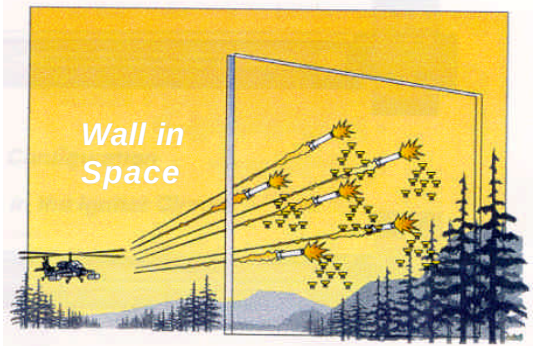
M261 MULTIPURPOSE SUBMUNITION (MPSM)

Aviation Rockets and Missiles



***SYSTEM DESCRIPTION*:** The MPSM HE warhead provides improved lethal effectiveness against area targets such as light armor, wheeled vehicles, materiel, and personnel. The Submunitions are deployed over the target and descend nearly vertical. The M73 Grenades are shaped charges with fragmentation dispersing 10-grain fragments radially over 360 degrees.



SYSTEM CHARACTERISTICS: The M261 Warhead is a cargo warhead consisting of a nose cone assembly, a warhead case, an integral fuze, 9 submunitions, and an expulsion charge assembly. The primary warhead fuze (M439) is remotely set with the Aerial Rocket Control System (ARCS), Multifunctional Display (MFD) or Rocket Management System (RMS) to provide range (time of flight) from 500 meters to 7200 meters. The warhead weight is 13.5 pounds. When mated to the MK66 motor, the live weight is 27.2 pounds; fired weight is 19.9 pounds. The overall length of the M261 Rocket is 66.10 inches.

WARHEAD: Initial forward motion of the rocket at firing initiates fuze timing. At fuze time, the fuze functions at a point before and above the **target** *(depending on the launch angle and range)* and the expulsion charge is initiated. The Sub-Munitions (SMs) are separated by ejection and arming occurs when the Ram Air Decelerator (RAD) deploys. The RAD virtually stops forward velocity and stabilizes the decent of the SM. An M230 Omni-directional fuze with an M55 detonator is used on each SM and is designed to function regardless of impact angle.

TARGET SETS: Anti-materiel *(command and control facilities, logistics facilities)*, anti-personnel, air defense systems *(mobile and fixed)*, and light armor *(wheeled and track)*.

CONTRACTOR: General Dynamics Ordnance Systems.

ACQUISITION PHASE: Production, Fielding/Deployment, and Operational Support.

MILESTONES:

Milestone III - February 1982

***FIELDING*:** Complete

POINTS OF CONTACT

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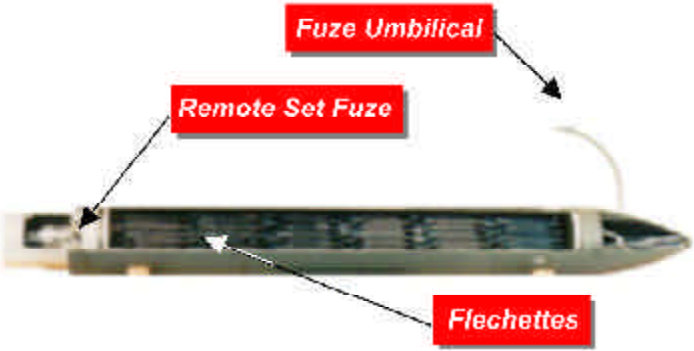
M255A1 FLECHETTE

Aviation Rockets and Missiles



***SYSTEM DESCRIPTION*:** The M255A1 flechette warhead is used primarily against antipersonnel targets: this warhead contains 1,179 sixty-grain, hardened steel flechettes and uses the M439 fuze. Currently this warhead is type classified for Special Operations Forces (SOF) only.

The M255A1 warhead was Conditionally Released to specific Army aviation units supporting overseas contingency combat operations in 1999.

SYSTEM CHARACTERISTICS: The M255A1 Warhead is a cargo warhead consisting of a nose cone assembly, a warhead case, an integral fuze, 1,179 sixty-grain flechettes, and an expulsion charge assembly. The primary warhead fuze (M439) is remotely set with the ARCS, MFD or RMS to provide range *(time of flight)* from 500 meters to 7200 meters. The warhead weight is 13.9 pounds. When mated to the MK66 motor, the live weight is 27.5 pounds while the fired weight is 20.3 pounds. The overall M255A1 Rocket length is 66.10 inches.

WARHEAD: The warhead is functionally equivalent to the M261 cargo warhead. Initial forward motion of the rocket at firing initiates fuze timing. At fuze time, the fuze functions at a point before the target *(optimized for flechette pattern)* and the expulsion charge is initiated. At expulsion, 1,179 flechettes separate and form a disk-like mass which breaks up with each flechette assuming an independent trajectory and form a repeatable dispersion pattern. The flechette uses kinetic energy derived from the velocity of the rocket to produce the desired impact and penetration effect on the target.

TARGET SETS: Anti-materiel *(command and control facilities, logistics facilities)*, anti-personnel, air defense systems *(mobile and fixed)*, and light armor *(wheeled and track)*.

CONTRACTOR: General Dynamics Ordnance Systems.

ACQUISITION PHASE: Production, Fielding/Deployment, and Operational Support.

MILESTONES:

Milestone III -September 1993

***FIELDING*:** Complete

POINTS OF CONTACT

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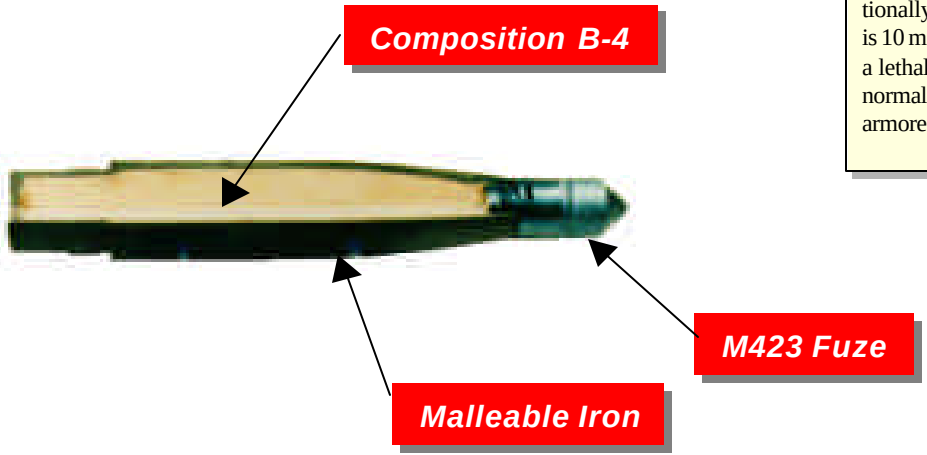
M151 HEPD

Aviation Rockets and Missiles

***SYSTEM DESCRIPTION*:** This is a 10-pound, high explosive, anti-personnel, anti-material warhead and is traditionally referred to as the 10-Pounder. The bursting radius is 10 meters; however, high velocity fragments can produce a lethality radius in excess of 50 meters. This warhead is normally employed against personnel, materiel, and lightly armored vehicles.



SYSTEM CHARACTERISTICS: The nose section is constructed of malleable cast iron that is threaded to receive the fuze. The base section is constructed of steel or cast iron and is threaded so that it can be attached to the rocket motor. Total weight of the loaded, unfuzed warhead is 8.7 pounds of which 2.3 pounds is composition B4. The M151 warhead weighs 9.3 pounds when fuzed with the M423/M427 point detonating fuze. Rocket live weight is 23 pounds while the fired weight is 15.7 pounds. The total rocket length is 55.1 inches.

WARHEAD: The M151 typically uses the M423 Fuze for helicopter applications and the M427 Fuze for fixed wing applications. The M151 uses 2.3 pounds of composition B-4 High Explosive. The 10 pound warhead gains lethality from the nose section which is fabricated using nodular, pearlitic malleable, or ferritic malleable cast iron. Temperature limits for storage and firing the M151 are -65 +150°F *(-53.35°C to +64.9°C)*.

TARGET SETS: Anti-materiel *(command and control facilities, logistics facilities)*, anti-personnel, air defense systems *(mobile and fixed)*, and light armor *(wheeled and track)*.

CONTRACTOR: General Dynamics Ordnance Systems.

ACQUISITION PHASE: Production, Fielding/Deployment, and Operational Support.

MILESTONES:

Milestone III -February 1982

***FIELDING*:** Complete

POINTS OF CONTACT

PM	Ms. Carlyn S. Frazier	carol.frazier@msl.army.mil	(256) 876-1117
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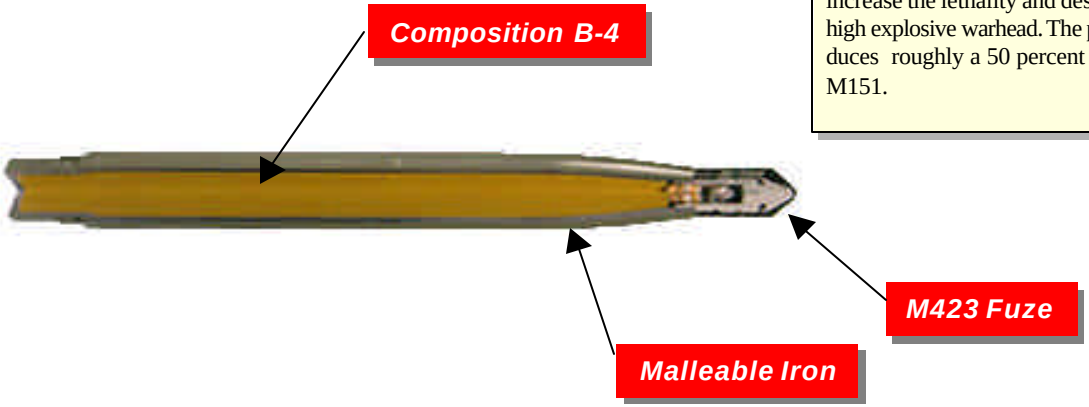
M229 HEPD

Aviation Rockets and Missiles

***SYSTEM DESCRIPTION*:** This item is an elongated version of the M151 Warhead and is commonly referred to as the 17-pound warhead. It was designed and developed to increase the lethality and destructiveness of the 10-pound, high explosive warhead. The performance of the M229 produces roughly a 50 percent increase in lethality over the M151.



SYSTEM CHARACTERISTICS: The total weight of the loaded, unfuzed warhead is 16.1 pounds *(7.3 kg)* of which 4.8 pounds *(2.18 kg)* is composite B-4 HE. Upon detonation, the warhead fragments into thousands of small, high velocity fragments. The picture above shows the M229 with an M423 fuze. Total M229 Rocket weight is 30.4 pounds live and 23.2 pounds fired. The rocket's overall length is 65.2 inches.

WARHEAD: The M229 uses the M423 Fuze for helicopter applications only as Type Classified for Special Operations Forces. The M229 uses 4.8 pounds of composition B-4 High Explosive. The warhead gains lethality from the nose section which is fabricated using nodular, pearlitic malleable, or ferritic malleable cast iron. Temperature limits for storage and firing the M229 are -65°F to +150°F *(-53.35°C to +64.9°C)*.

TARGET SETS*:* Anti-materiel *(command and control facilities, logistics facilities)*, anti-personnel, air defense systems *(mobile and fixed)*, and light armor *(wheeled and track)*.

CONTRACTOR: General Dynamics Ordnance Systems.

ACQUISITION PHASE: Production, Fielding/Deployment, and Operational Support.

MILESTONES:

Milestone III -September 1993

FIELDING**:** Complete

POINTS OF CONTACT

PM	Ms. Carlyn S. Frazier	carol.frazier@msl.army.mil	(256) 876-1117
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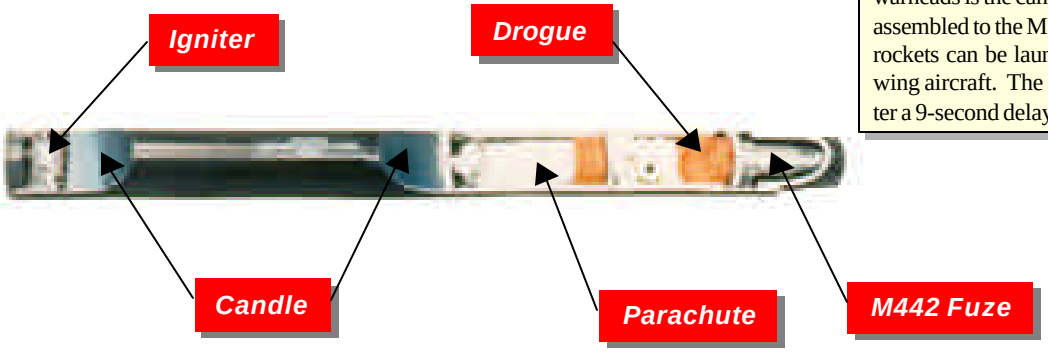
M278 IR FLARE/M257 ILLUMINATION

***SYSTEM DESCRIPTION*:** These warheads were designed for battlefield target illumination; the M278 in conjunction with Infrared (IR) goggles. The only difference between the warheads is the candle composition. The flare warheads are assembled to the MK66 Rocket Motor in the field. The flare rockets can be launched from either fixed-wing or rotary-wing aircraft. The M442 motor burnout fuze functions after a 9-second delay.



SYSTEM CHARACTERISTICS: The M278 provides an average near IR light output of 250 watts/steradian and less than 2K candle power of visible light with a desired goal of 1K candle power. The IR flare will provide IR light for 3 minutes. Time to candle ignition from launch is 13.5 seconds. The M257 candle descends at 15 feet per second and burns for approximately 100 seconds with a minimum light output of one million candle power. Warhead weight is 10.6 pounds. M278 Rocket weight is 24.2 pounds live and 17 pounds fired. Overall rocket length is 70.4 inches.

WARHEAD: Except for the illuminant, the M278 is identical to the M257 warhead. At the aft end of the Separation and Drogue Assembly is the Motor Adapter which is the threaded interface for the launch rocket motor. Inside the adapter is the M442 fuze which initiates the firing sequence for the M278 flare. The fuze must sense an acceleration of at least 17-22 G for about 1 second prior to arming. Upon deceleration of the burnt-out rocket motor the armed fuze fires, directing its output into a 9-second pyrotechnic delay column which in turn ignites a separation charge. A Deflector plate pulls the expended motor out of the flare flight path. When the Pusher Plate falls into the air stream it pulls the Drogue Chute out and initiates a 2-second delay "Gas Generator" which fires a Secondary Expulsion charge that provides a separation force to the Drogue Housing and the Candle & Parachute Assembly. *(The M278 is Type Classified (TC), Standard, for Special Operations Forces and Navy.)*

TARGET SETS*: N/A*

CONTRACTOR: General Dynamics Ordnance Systems.

ACQUISITION PHASE: Production, Fielding/Deployment, and Operational Support.

MILESTONES:

Milestone III -June 1993 *(M278)*

Milestone III - December 1987 *(M257)*

***FIELDING*:** Complete

POINTS OF CONTACT

PM	Ms. Carlyn S. Frazier	carol.frazier@msl.army.mil	(256) 876-1117
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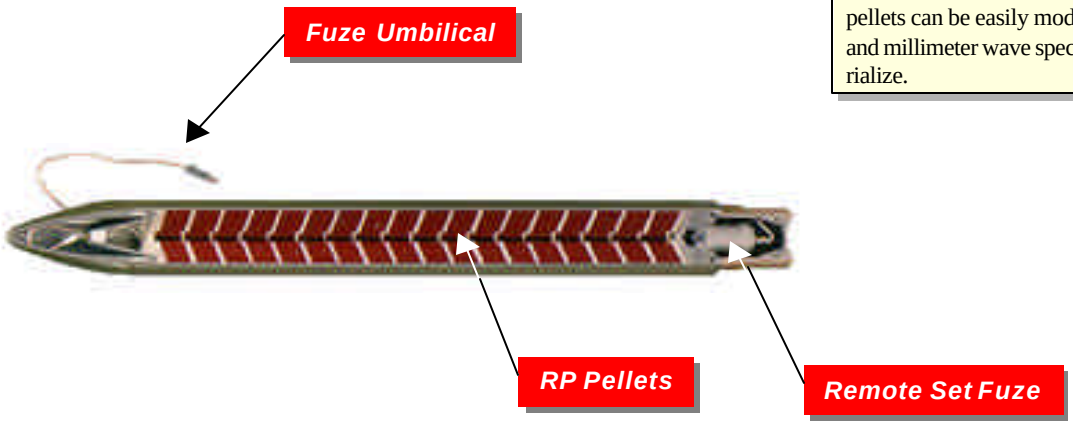
M264 RP SMOKE

Aviation Rockets and Missiles

***SYSTEM DESCRIPTION*:** The M264 Warhead is used for smoke obscuration in the visible light spectrum. The pellets can be easily modified for fill content to obscure IR and millimeter wave spectrums should a requirement materialize.



SYSTEM CHARACTERISTICS: The M264 RP Smoke is used as a red phosphorus (RP) filled smoke rocket propelled by the MK66 motor and functions at a remote settable range from 1000 to 6000 meters. The burning RP drops to the ground producing a voluminous cloud of white smoke. Fourteen M264 rockets will screen a 300-400 meter front with a 5-10 knot wind from the unaided eye for a minimum of 5 minutes. The warhead weight is 8 pounds. The M264 Rocket weight is 21.6 pounds live and 14.4 pounds fired. Overall length of the rocket is 66.1 inches.

WARHEAD: The M264 RP Smoke is also a cargo warhead. The warhead is used as a red phosphorus (RP) filled smoke rocket propelled by the MK 66 motor and functions at a remote settable range from 1000 to 6000 meters. Upon functioning, the M439 Fuze ignites the BKNO3 expulsion mix which, using a vented pusher plate, simultaneously ignites and ejects the 5-pound RP payload through the shear-pinned nose cone. The burning RP drops to the ground producing a voluminous cloud of white smoke. Fourteen M264 rockets will screen a 300-400 meter front with a 5-10 knot wind from the unaided eye for a minimum of 5 minutes. The RP pellet stack assembly consists of 72 RP pellets arranged in 18 rows of 4 each and are separated by felt pieces impregnated with a phosphine gas adsorbent mixture comprised of manganese dioxide/cuprous oxide.

TARGET SETS*: N/A*

CONTRACTOR: General Dynamics Ordnance Systems

ACQUISITION PHASE: Production, Fielding/Deployment, and Operational Support.

MILESTONES:

Milestone III - July 1995

FIELDING**:** Complete

POINTS OF CONTACT

PM	Ms. Carlyn S. Frazier	carol.frazier@msl.army.mil	(256) 876-1117
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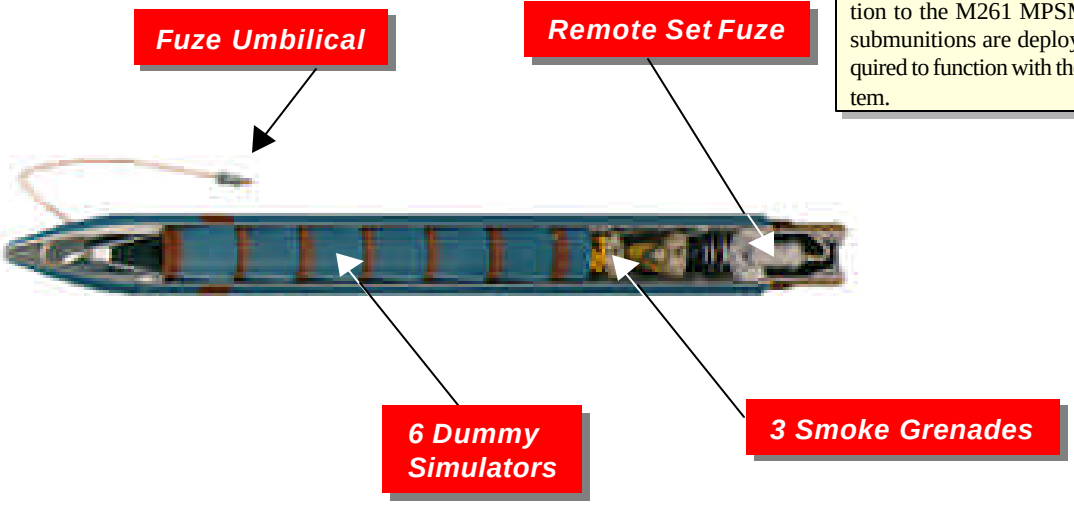
M267 PRACTICE

Aviation Rockets and Missiles

***SYSTEM DESCRIPTION*:** The M267 Practice Warhead is a physical and ballistic match that is identical in operation to the M261 MPSM HE Warhead except that three submunitions are deployed. Only one submunition is required to function with the Automated Weapon Scoring System.



SYSTEM CHARACTERISTICS: The warhead weight is 13.5 pounds. When mated to the MK66 motor, the live weight is 27.2 pounds while the fired weight is 19.9 pounds. The overall M267 Rocket length is 66.10 inches.

WARHEAD: The M267 uses the same warhead components as the M261 Warhead. The submunition fuzes are the M231and the signature grenades are the M75.

TARGET SETS: Not applicable

CONTRACTOR: General Dynamics Ordnance Systems

ACQUISITION PHASE: Production, Fielding/Deployment, and Operational Support.

MILESTONES:

Milestone III -February 1982

***FIELDING*:** Complete

POINTS OF CONTACT

PM	Ms. Carlyn S. Frazier	carol.frazier@msl.army.mil	(256) 876-1117
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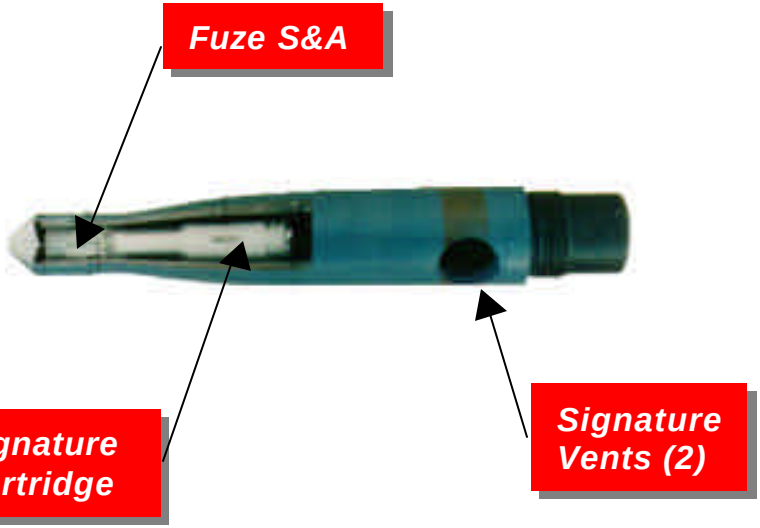
ASA(ALT)	MAJ(P) Eric Fletcher	eric.fletcher@saalt.army.mil	(703) 604-7210

***SYSTEM DESCRIPTION*:** This warhead is an identical flight match for the M151 to provide training with a smoke signature upon impact during practice firing. The signature includes a report to function with the Automated Weapon Scoring System.



SYSTEM CHARACTERISTICS: The M274 warhead weighs 9.3 pounds. Rocket live weight is 23 pounds and 15.7 pounds fired. The total rocket length is 55.1 inches.

WARHEAD: The M274 consists of a modified warhead casing (WTU-1/B) with vent holes, an M423 Fuze Safe and Arming (S&A) device, and a smoke cartridge to provide the signature flash.

TARGET SETS: Not applicable

CONTRACTOR: General Dynamics Ordnance Systems.

ACQUISITION PHASE: Production, Fielding/Deployment, and Operational Support.

MILESTONES:

Milestone III - August 1986

***FIELDING*:** Complete

POINTS OF CONTACT

PM	Ms. Carlyn S. Frazier	carol.frazier@msl.army.mil	(256) 876-1117
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